Case Studies of DER Projects

Fermilab – US Dept of Energy

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Distributed Energy Resources

Overview

Distributed Energy Resources (DER) involves placing energy generation systems near, or at, the point of use, improving electric reliability and power quality for customers.

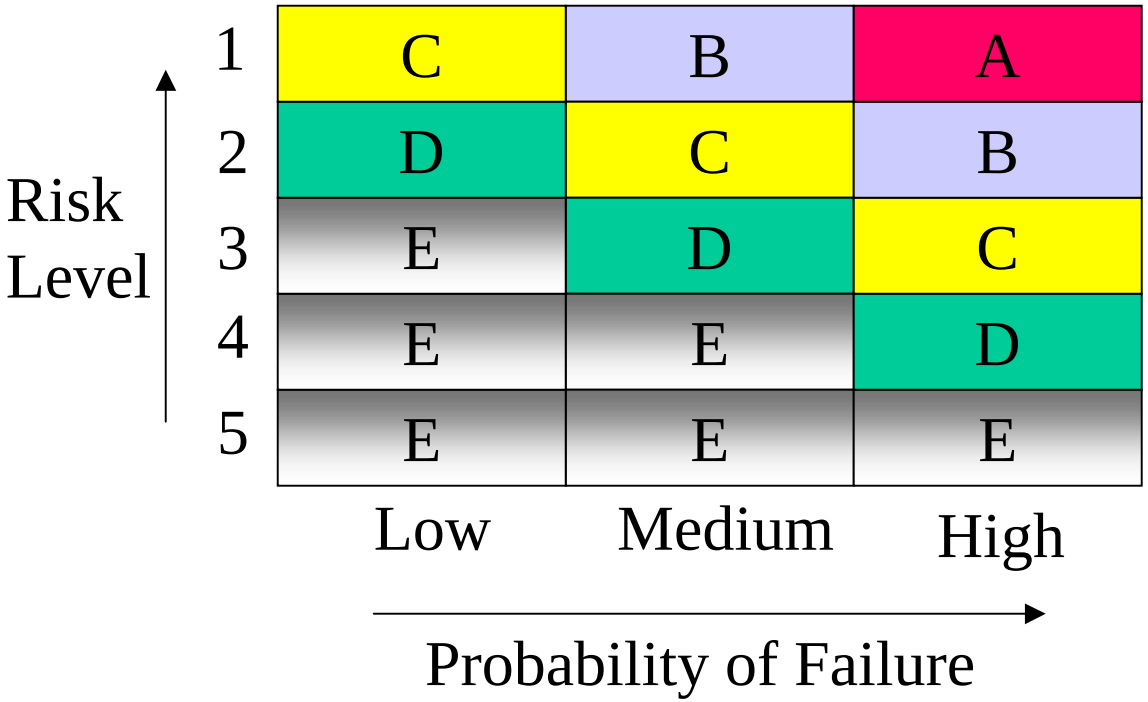
DER complements the existing transmission and distribution system and enables use of waste heat…in CHP applications.

Infrastructure Management Focus

Develop and ***execute*** strategies that increase the reliability and robustness of ***infrastructure systems*** to strengthen the base from which ***existing*** and ***future*** mission objectives can be accomplished ***safely*** and ***without interruption***

<u>UESC and ESPC Financing Vehicles</u>

Infrastructure Priority Assessment



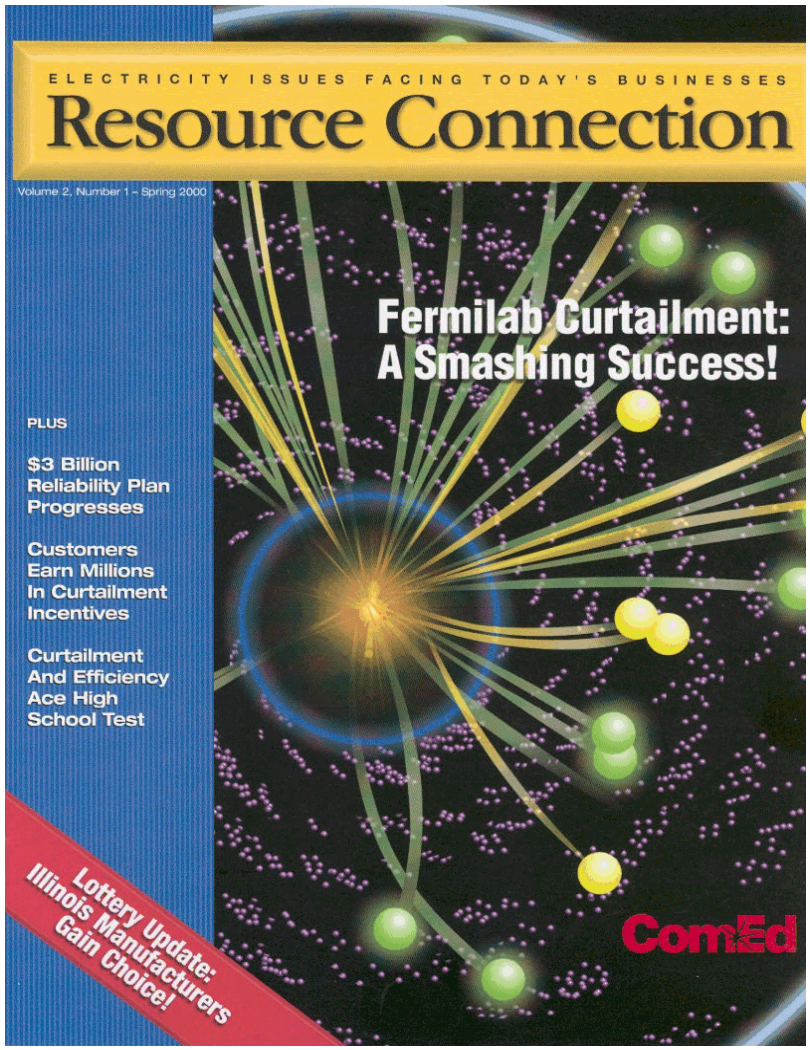
Alternative Financing Partnership

- Utility Situation
  - Public Utility Commission DSM/curtailment push
  - Increasing competitive pressure & customer focus
- Federal Facilities
  - Declining budgets & mandated conservation goals
  - Deteriorating infrastructure and reliability issues
    1. 13.8kV Feeder and Switching Upgrades
    2. Sub-station Improvements (CUB Double-Ended)
    3. Critical Backup Generators (KRS 100kW)
    4. Curtailment/Peaking (FCC and CHP-Biomass)

13.8kV Feeder and Switching Infrastructure Modernization

Central Utility Building
408/4160v Sub-Station Upgrade

16mW Fermilab Curtailments



Feynman Computing Center
1.5mW Generator and Switchgear

Feynman Computing Center Power Generation

World center for HEP computing

- Outages 2-3 times annually w/o generator
- Difficult to schedule Feeder maintenance
- Downtime affects institutions around the world
- Downtime affects accelerator operations
- Takes 8 hrs to fully recover from outage
- Design includes metering and transition capabilities for power revenue benefits

Fermilab Power Purchase Issues

- CTCs preclude full and open competition
- PPOs change year-to-year (NFF vs. MI)
- PUC concerns over application of tariff rates to large customer accounts
- Applicability of VLR vs. Rider 32 for curtailment credits
- EA curtailment applicability in new markets

The Fermilab 40mW CHP-Biomass DER Initiative

- Currently progressing through studies
  - Landfill gas on/off-peak component with waste heat for cryogenic plant use
  - Natural gas on-peak component
- Benefits include:
  1. Power reliability to support mission
  2. Environmental GWP reduction and grid support
  3. Power costs savings and price stability